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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/707,979	01/29/2004	Brian T. Denton	BUR920030198US1	1978

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EXAMINER	
FLEISCHER, MARK A	

ART UNIT	PAPER NUMBER
3624	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/707,979	DENTON ET AL.	
	Examiner	Art Unit	
	MARK A. FLEISCHER	3624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2004 and 26 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 January 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2 Feb. 2009, 16 Oct. 2008, 20 Feb. 2004 and 29 Jan. 2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of Claims

1. This action is in reply to the Application filed on 29 January 2004.
2. Claims 1-27 are currently pending and have been examined.

Claim Objections

3. Claims 1, 8, 15 and 21 are objected to because of the following informalities: The claims use the phrase "iteratively repeating" which is somewhat redundant. Appropriate correction is required.
4. Claims 14, 20 and 27 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. The phrase "processed simultaneously or separately" does not limit the parent claim because such qualifications are mutually exclusive and therefore the capability to process with either qualification does not provide any further limitation. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the second paragraph of 35 U.S.C. §112:

   The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1, 3, 4, 10, 16 and 23 are rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

   - **Claim 1** recites "allocating resources **to** different priorities by…" (emphasis added) and does not make any sense. Examiner notes that allocation decisions may be made based on priorities, but the allocation is to and among **groups receiving such allocations** and not to

'priorities'. The current phraseology makes the claim unclear and confusing as the claim does not clearly specify how the allocation decisions are made. In addition, the term "consistent with" in the claim is also rather vague. For purposes of examination, Examiner interprets the claim as meaning that allocations are based sequentially to groups with groups having higher priority levels first and that once a higher level allocation is made, the allocation to lower level ranking groups are made based on the current supply (*i.e.,* consistent with).

- **Claim 3** recites "…comprise a full spectrum range within each set of priorities.", wherein the terms "full spectrum range" is unclear and vague. Does this mean that backorder costs have a lower bound and an upper bound? If so, what are they? Neither the specification nor the claim provide clarification as to what the terms mean and one of ordinary skill in the art would not be apprised of the scope of the invention.
- **Claim 4** recites "as a starting point", but this could mean the solution is used as in an initial feasible solution to a linear program or it can refer to the remaining level of resources. Thus, the phrase is vague and indefinite.
- **Claims 10, 16 and 23** recite that a "model uses results" of the previous…" wherein results can mean the values of the decision variables used as constraints, or the values of the optimal solution of the previous stage. The term 'result' is vague and indefinite.

Claim Rejections - 35 USC § 101

7. 35 U.S.C. §101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

8. Claims 1-27 rejected under 35 U.S.C. §101 because the claimed invention is directed to non-statutory subject matter. Based on Supreme Court precedent, and recent Federal Circuit decisions, the Office's guidance to examiners is that a §101 process must (1) be tied to another statutory class (such as a particular apparatus) or (2) transform underlying subject matter (such

as an article or materials) to a different state or thing. *Diamond v. Diehr*, 450 U.S. 175, 184 (1981); *Parker v. Flook*, 437 U.S. 584, 588 n.9 (1978); *Gottschalk v. Benson*, 409 U.S. 63, 70 (1972); *Cochrane v. Deener*, 94 U.S. 780,787-88 (1876). An example of a method claim that would not qualify as a statutory process would be a claim that recited purely mental steps. Thus, to qualify as a §101 statutory process, the claim should positively recite the other statutory class (the thing or product) to which it is tied, for example by identifying the apparatus that accomplishes the method steps, or positively recite the subject matter that is being transformed, for example by identifying the material that is being changed to a different state. Examiner notes that while some of these claims (claims 21-27) do recite some components of the elements of another statutory class, they are insufficient to substantively tie them to another statutory class in that no correspondence is discernable between the various method steps and the particular components of the computer system.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1, 2, 5, 6, 8, 9, 15, 21 and 22 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US 7197469 B2) in view of de Farias (*The Linear Programming Approach To Approximate Dynamic Programming: Theory And Application*).

Claims 1, 8, 15 and 21:

Although claims 1, 8, 15 and 21 are worded and/or structured slightly differently, they have the same scope and so are addressed together. Hegde teaches the following limitations as shown.

- *allocating resources* (Hegde [abstract] teaches "allocating resources including component supply…") *to different priorities* (Hegde [4,31] states "allocating resources sequentially at each level based on a priority ranking…" (emphasis added)) *by iteratively solving mathematical linear programs* (Hegde [12,19] refers to iteration and Hegde [4,31] teaches using "linear programming"), *wherein each mathematical linear program optimizes according to one of a plurality of sets of priorities wherein each set contains a plurality of priorities, and each iterative solution is consistent with the previous solution* (Hegde [abstract] teaches a system and method "for the optimal allocation of supply and capacity over time that satisfy two key requirements (a) being consistent with accepted operational objectives (e.g. low inventory, short lead times, prioritized allocation of supply and capacity) […]" (emphasis added) where the consistency is with the previous allocation hence consistent with the previous solution.). Hegde does not specifically teach a sequence of linear programs and
- *aggregating said demand priorities into different priority groups;*
- *allocating said resources to the highest priority group of demand priorities using a first linear programming model;*
- *allocating remaining resources to the next highest priority group of demand priorities using a second linear programming model, wherein said second linear programming model uses results from said first linear programming model; and*
- *iteratively repeating said process of allocating remaining resources to the remaining groups of demand priorities in order of priority,*

but de Farias, in an analogous art, does and teaches use of "approximate dynamic programming" wherein problems are segregated into stages (de Farias [p.98] refers to priorities wherein priority levels serve as stages) that are solved iteratively by linear programming problem formulations. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and de Farias so that optimal allocations can be made among a plurality of based on priority levels

Claim 2:

Hegde teaches the following limitations as shown.

- *said priorities are hierarchical and comprises two or more levels of hierarchy* (Hegde [2,60] teaches a set of hierarchical tiers and based on priority allocations (Hegde [abstract]).

Claim 5:

Hegde does not specifically teach

- *adding constraints to said mathematical linear programs at each iteration to ensure that solutions to subsequent iterations are consistent with previous solutions,* but Examiner takes **Official Notice** that it is old and well-known as well as common place in the mathematical sciences that mathematical programs, and in particular, dynamic programming problems are problems that are posed in a well-defined formulation wherein adding additional constraints in one stage maintains feasibility in the previous stage or within the problem definition without the additional constraint. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to add additional constraints indicating the allocation of supply for that stage and wherein such additional constraint by definition maintains feasibility with the previous stage.

Claim 6:

Hegde teaches the following limitations as shown.

- *said method uses a different mathematical linear program for each iteration* (Hegde [2,10] refers to multiple stages.) Hedge does not specifically state that there is a new linear program for each iteration (stage), but Examiner takes **Official Notice** that it is old and well-known as well as common place in the dynamic programming sciences to use a new formulation of a linear program by adding constraints based on prior allocations and such new constraints, *ipso facto,* result in a different mathematical linear program. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have

had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 9 and 22:

Hegde teaches the following limitations as shown.

- *when repeating said process of allocating remaining resources, said method uses a different linear programming model for each iteration* (see the rejection of claim 6). Hedge does not specifically state that there is a new linear program for each iteration (stage), but de Farias, in an analogous art does. de Farias teaches use of approximate dynamic programming (DP) wherein each stage in the DP is approximately solved by formulating an associated linear program (LP) and using the allocation obtained to determine the resource quantities available for the succeeding stages (priority groups) which are similarly formulated as LPs but with different constraints owing to the prior allocation. Moreover, Examiner takes **Official Notice** that it is old and well-known as well as common place in the dynamic programming sciences to use a new formulation of a linear program by adding constraints based on prior allocations and such new constraints, *ipso facto,* result in a different mathematical linear program. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

11. Claims 3, 4, 7, 10–14, 16–20 and 23–27 are rejected under 35 U.S.C. §103(a) as being unpatentable over Hegde, et al. (US 7197469 B2) in view of de Farias (*The Linear Programming Approach To Approximate Dynamic Programming: Theory And Application*) and further in view of Fakhouri, et al. (US 746147 B1) and further in view of Leachman, et al. (*IMPReSS: An Automated*

Production-Planning and Delivery-Quotation System at Harris Corporation-Semiconductor Sector).

Claim 3:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *backorder costs penalties are determined independently for each set of priorities and comprise a full spectrum range within each set of priorities* (Fakhouri [29,23] states "In such environments, multiple independent decision support systems can co-exist in a cooperative and/or hierarchical manner." (emphasis added)). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri because both refer to resource allocation decisions that are prioritized in a hierarchical fashion and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Neither Hegde nor Fakhouri specifically refer to backorder penalty costs (but see Hegde [5,5] wherein back ordering costs are described), but Leachman, in an analogous art does. Leachman [p.21, col.1] states "Cash flows in the objective function include the sales revenue of each finished goods type (forecast demands case), backorder costs for supply that is delivered late (order-board demands case), inventory holding costs for excess bin output, and the incremental cost of producing additional source product." (emphasis added) where the emphasized text corresponds to *backorder costs penalties*. Although Leachman does not specifically use the term 'penalties', Examiner takes **Official Notice** that it is old and well-known as well as common place in the management science arts to refer to backorder costs or other constraint violations as penalties that are included in the objective function of a mathematical program. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, Fakhouri and Leachman as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary

skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claim 4:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *said mathematical linear programs solved in each iteration use the solution to the previous mathematical linear program as a starting point* (Fakhouri [36,18] states "A scheme for performing the allocation of various resources based on the values for the various resources in the integer solution solution [*sic*] obtained in the previous step.").

Examiner takes **Official Notice** that it is old and well-known as well as common place in the management sciences that decision/allocation problems with multiple stages are often posed as dynamic programming problems wherein each stage provides the starting point or allocation for the next stage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, Fakhouri and Leachman and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claim 7:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *said allocating process solves said mathematical linear programs for higher priorities before solving for lower priorities* (Fakhouri [5,14] states "For example, if two resources depend on a resource that can only support one of them, then one way to resolve the conflict is to allocate the scarce resource to the resource with higher priority.").

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri and what is old and well-known in the art as the

use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups before lower priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 10, 16 and 23:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *each different linear programming model uses results of the previous linear programming model* (see the rejection of claim 4).

Examiner takes **Official Notice** that it is old and well-known as well as common place in the management sciences that decision/allocation problems with multiple stages are often posed as dynamic programming problems wherein each stage provides the starting point or allocation for the next stage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde, Fakhouri and Leachman and what is old and well-known in the art as the use of optimization techniques such as linear programming sequentially applied to prioritized groups in a hierarchy would promote optimal resource allocations to such higher priority groups and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 11, 17 and 24:

Hegde does not specifically teach the following limitations as shown, but Fakhouri, in an analogous art, does.

- *during said allocating processes, each linear programming model fixes variables associated with priority groups that have a lower priority than the priority group to which the resources are currently being allocated* (Fakhouri [38,40-2] teaches fixing variables according to the solutions of previous stages.). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hegde and Fakhouri because both refer to resource allocation decisions that are prioritized in a hierarchical fashion and wherein resource

allocation decisions associated with higher priority, hence established in earlier stages are fix thereby adding constraints so that subsequent formulations remain feasible for earlier ones and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Claims 12, 18 and 25:

Hegde teaches the following limitation as shown.

- *during said allocating processes, each linear programming model allocates the full range of backorder costs within the priority group to which the resources are currently being allocated* (Hegde [5,2-7] states "As is known, LP used in BCD is formulated as a cost minimization problem where the objective function is comprised of costs for processing, shipping, back ordering, inventory holding, and material substitution, as well as negative revenues, all of which are linear in their respective decision variables.").

Claims 13, 19 and 26:

Hegde teaches the following limitation as shown.

- *dividing said priority groups into different sub-priority tiers* (Hegde [2,36] teaches a tiered planning system and where each tier comprises a range such as "3 months to 7 yr" (Hegde [2,42]) which constitute a set of sub-priority levels. See also Hegde [16,34-38] which teaches "additional level of priority").

Claims 14, 20 and 27:

Hegde, does not specifically teach *said sub-priority tiers can be processed simultaneously or separately,* but Fakhouri, in an analogous art, does. Fakhouri [4,55] teaches satisfying multiple constraints simultaneously, and in [26,15] states "Tasks are defined such that (a) each task is computationally significant as to the bookkeeping costs of managing parallelism" (emphasis added) where 'parallelism' indicates simultaneous processing. Furthermore, Examiner takes **Official Notice** that it is old and well-known as well as common place in the data processing arts to enable processes to be performed either separately or in parallel, *i.e.,* simultaneously. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to enable separate or simultaneous processing of

resource allocation decisions depending on what is necessary and convenient and one of ordinary skill in the art would have had the technical capability to combine these teachings which would have had predictable outcomes.

Conclusion

Any inquiry of a general nature or relating to the status of this application or concerning this communication or earlier communications from the Examiner should be directed to **Mark A. Fleischer** whose telephone number is **571.270.3925.** The Examiner can normally be reached on Monday-Friday, 9:30am-5:00pm. If attempts to reach the examiner by telephone are unsuccessful, the Examiner's supervisor, **Bradley Bayat** whose telephone number is **571.272.6704** may be contacted.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal/pair <http://pair-direct.uspto.gov >. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at **866.217.9197** (toll-free).

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/Mark A Fleischer/
Examiner, Art Unit 3624 13 March 2009

/Bradley B Bayat/
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